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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,228	06/30/2003	Shiquan Tao	2343-169-27	1763

7590 05/11/2005

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EXAMINER

MARKHAM, WESLEY D

ART UNIT	PAPER NUMBER
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1762

DATE MAILED: 05/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/608,228

Applicant(s)

TAO ET AL.

Examiner

Wesley D. Markham

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 2 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-40 is/are pending in the application.
- 4a) Of the above claim(s) 21-40 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-20 is/are allowed.
- 6) ☐ Claim(s) \_\_\_\_ is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 8/12/2003.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## **DETAILED ACTION**

### ***Election/Restrictions***

1. Acknowledgement is made of the applicant's election, with traverse, of Group I, drawn to a method for preparing an optical fiber for use as a transducer in a moisture sensor, in the response filed on 4/22/2005. However, after further consideration by the examiner, further restriction is required as set forth below.
2. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 1 – 20, drawn to a method for preparing an optical fiber for use as a transducer in a moisture sensor, classified in class 427, subclass 163.2.
  - II. Claim 21, drawn to a transducer for an optical fiber moisture sensor, classified in class 385, subclass 128.
  - III. Claim 22, drawn to a method for making a sol-gel silica solution, classified in class 516, subclass 111.
  - IV. Claims 23 – 40, drawn to an optical fiber moisture sensor, classified in class 385, subclass 12.
3. The inventions are distinct, each from the other because of the following reasons:
4. Inventions I and II are related as process of making and product made, respectively.

The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another and materially different process, such as a process that comprises removing

the cladding from the optical fiber by a method other than heating (e.g., acid or base removal), a process that does not comprise soaking the portion of the optical fiber in a solution to wash off organic material, and/or a process in which desired portions of the optical fiber are not clad to begin with (i.e., no removal of the cladding layer is required or performed).

5. Inventions I and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility, such as making a porous sol-gel silica solution for coating an article other than an optical fiber (e.g., a lens, a glass or plastic sheet, etc.), and invention I has separate utility, such as preparing an optical fiber transducer by coating with a silica sol-gel solution that is made by a method other than that of invention III (e.g., a multi-step method that does not consist of the single step recited in invention III). See MPEP § 806.05(d).
6. Inventions I and IV are related as process of making and product made, respectively. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, the product as claimed can be made by another materially different process, such as a process that comprises removing the cladding from the optical fiber by a method other than heating (e.g., acid or base removal), a process that does not comprise soaking the

portion of the optical fiber in a solution to wash off organic material, and/or a process in which desired portions of the optical fiber are not clad to begin with (i.e., no removal of the cladding layer is required or performed). Also, the process as claimed can be used to make other and materially different product, such as a coated optical fiber by itself, or a sensor that does not comprise a photodetector.

7. Inventions II and III are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility, such as making a porous sol-gel silica solution for coating an article other than an optical fiber (e.g., a lens, a glass or plastic sheet, etc.) to form an article other than an optical fiber transducer. See MPEP § 806.05(d).
8. Inventions II and IV are related as subcombination and combination, respectively. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination (the optical fiber moisture sensor) does not require that the ends of the optical fiber be polished, the cladding be removed, and/or the surface hydroxyl groups be activated. The subcombination has separate utility such as a transducer in a sensor other than a moisture sensor (e.g., gas sensor), or as a coated optical fiber by itself (e.g., to simply guide light).

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9. Inventions III and IV are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention III has separate utility such as making a porous sol-gel silica solution for coating an article other than an optical fiber (e.g., a lens, a glass or plastic sheet, etc.) to form an article other than an optical fiber moisture sensor. See MPEP § 806.05(d).
10. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.
11. During a telephone conversation with Mr. Steven Kelber on 5/3/2005, a provisional election was made with traverse to prosecute the invention of Group I, Claims 1 – 20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 21 – 40 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.
12. Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).
13. In the reply filed on 4/22/2005, the applicant traversed the previous restriction requirement by arguing that no serious burden would be imposed on the examiner by examination of all the claims in the instant application. This is not found

persuasive because a serious burden on the examiner does exist for the following reasons: (1) different areas of search (classes / subclasses) are required for each of the claimed inventions, (2) different search strategies are required for each of the claimed inventions, and (3) different and diverse issues are raised when considering the patentability of several inventions belonging to separate statutory classes (e.g., different patentability questions arise in the examination of "method" claims as opposed to "product" claims). Please note that, for the purposes of restriction, a serious burden on the examiner is *prima facie* shown by an appropriate explanation of separate classification (MPEP 803), as set forth above. No evidence has been submitted by the applicant to rebut this *prima facie* showing.

#### ***Information Disclosure Statement***

14. The IDS filed by the applicant on 8/12/2003 is acknowledged, and the references listed thereon have been considered by the examiner as indicated on the attached copy of the PTO-1449 form.

#### ***Ex Parte Quayle***

15. This application is in condition for allowance except for the following formal matters:

- Non-elected Claims 21 – 40 must be canceled.
- In Figures 2 and 9 of the drawings filed on 6/30/2003, the "w/o coating", "ratio", "w/coating", "TEST week 1", "TEST week 2", and "TEST week 3" labels are hand-written and unclear (i.e., the drawings do not comply with 37

CFR 1.84(l), which requires all the lines, numbers, and letters to be uniformly thick, dark, and well-defined).

- In each of Figures 4, 5, and 7 – 10, it is unclear which “legend entry” corresponds to which “data line” because all the lines in each Figure appear to be similar or the same (i.e., each line is the same color (black) and the same thickness). This situation renders the data shown in Figures 4, 5, and 7 – 10 unclear.
- At the top of Figure 12, the word “optical” is misspelled “ptical”.
- On page 8, line 17, of the specification, the word “straight” is misspelled “strait”.
- The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Specifically, the specification lacks antecedent basis for the following limitations in the context of the claimed invention: Performing soaking step (c) for at least 30 minutes (Claim 3), the second solution is at least a 2 M NaOH solution (Claim 5), refrigerating for at least 12 hours (Claim 8), the specific compounds used as the silicate ester (Claim 15), a mineral acid catalyst (Claim 16), a thin layer of silicone rubber solution (Claim 17), and the specifics of the silicone rubber coating process (Claims 18 and 19). Appropriate correction is required.
- In Claim 20, the phrase, “applying a second coating to said portion of said optical fiber with a permeable protective coating...” appears to contain a



typographical error and should read, "applying a second coating to said portion of said optical fiber, the second coating being a permeable protective coating..." because it is the second coating that is permeable and protective, not the portion of the optical fiber itself.

***Allowable Subject Matter***

16. Claims 1 – 20 are allowed.

17. The following is an examiner's statement of reasons for allowance: As embodied by independent Claim 1, the claimed method is drawn to preparing an optical fiber for use as a transducer in a moisture sensor. The method comprises polishing the two ends of an optical fiber, removing the cladding layer from a portion of the optical fiber by heating, soaking the portion in a first solution to wash off any organic material sticking on the surface of the portion of the optical fiber, soaking the portion in a second solution until surface hydroxyl groups of the portion are activated, and coating the portion of the optical fiber with a porous sol-gel silica solution. A summary of the closest prior art of record follows. Miyata (JP 01-193628 A) teaches producing an optical fiber moisture sensor by removing the cladding from portions of the fiber and then forming a porous SiO<sub>2</sub> layer on the aforementioned portions, and Tsutsui et al. (JP 63-265140 A) teaches a similar method of making an optical fiber humidity sensor. Badini et al. ("Sol-gels with fiber-optic chemical sensor potential: Effects of preparation, aging, and long-term storage", 1995), Goldstein (USPN 6,819,811), Farquharson et al. (USPN 6,623,977), Noire et al. (US 2002/0182740

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A1), Watkins et al. (USPN 6,241,948), Wicks et al. (USPN 5,637,507), Ronnekleiv et al. (US 2002/0041724 A1), and Skutnik (USPN 6,810,184) all teach optical fiber-based probes and/or sensors that comprise a porous silica / sol-gel coating, as well as methods of making the same. However, the prior art of record, alone or taken collectively, does not teach or reasonably suggest the combination of steps required by independent Claim 1 (i.e., polishing the optical fiber ends, removing the cladding layer from a portion of the optical fiber by heating, soaking the portion in a first solution to wash off any organic material sticking on the surface of the portion of the optical fiber, and soaking the portion in a second solution until surface hydroxyl groups of the portion are activated) in the context of coating at least a portion of an optical fiber with a porous silica sol-gel solution. Therefore, independent Claim 1 is allowed. Claims 2 – 20 are all process claims that depend from independent process Claim 1 and are therefore also allowed.

18. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### **Conclusion**

Prosecution on the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213. A shortened statutory period for reply to this action is set to expire **TWO MONTHS** from the mailing date of this letter.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wesley D. Markham whose telephone number is (571) 272-1422. The examiner can normally be reached on Monday - Friday, 8:00 AM to 4:30 PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tim Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



WDM

Wesley D Markham  
Examiner  
Art Unit 1762



TIMOTHY MEESKS  
SUPERVISORY PATENT EXAMINER